

Simultaneous Measurement of Viscosity and Density with a Capillary Tube Viscometer: Preliminary results for CO₂, Hexanol, Nonane and Decane

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In this work, preliminary results of simultaneous measurements of dynamic viscosities and densities for CO₂, hexanol, nonane and decane are presented. The viscosity have been measured with a modified capillary viscometer designed and built to operate at pressures up to 40 MPa and temperatures up to 473.15 K. To increase the precision of the developed instrument, the density of fluids in study has been simultaneously determined (to the same conditions of viscosity measurements) with a calculated experimental uncertainty of the order of ± 0.26 kg/m³. The dynamic viscosity and densities were measured at pressures up to 30 MPa and temperatures up to 353 K. The total uncertainties of the dynamic viscosity measurements were estimated to be less than 0.75%. The measured dynamic viscosities and densities were compared with data, predictions and correlations previously reported in the literature, where the differences between the literature and the measurements reported here are less than 0.6% for viscosity and less than 0.04% for density.